RCA Revista de Ciências da Administração

v. 27, n. 67, p. 1-26, 2025

DOI: https://doi.org/10.5007/2175-8077.2025.e101057

# Organizational learning system in a public company: model validation of the relationship between stocks and flows of learning with business performance

*Sistema de aprendizagem organizacional em uma empresa pública: validação de modelos da relação entre os estoques e fluxos de aprendizagem com o desempenho de negócio*

*Sistema de aprendizaje organizacional en una empresa pública: validación de modelos de la relación entre stocks y flujos de aprendizaje con desempeño empresarial*

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## ABSTRACT

**Purpose:** To describe the organizational learning system, identifying the relationship between stocks and flows of learning with business performance, in the perception of employees of a public company. **Methodology:** Bontis et al. (2002) model was replicated, and an alternative model with the insertion of feedforward and feedback flows was tested. The SLAM questionnaire was applied to a sample of 858 employees of a public company in the agricultural sector, here called AGRO. Data analysis was carried out using descriptive and multivariate statistics – structural equation modeling. **Results:** The results revealed the reliability of the scale constructs and factors, validating it for the sample. The two models showed explanatory power for the relationship between the stocks and flows of learning with the business performance. **Originality/relevance:** This research strengthens knowledge in quantitative research to measure organizational learning, specifically in the context of public service, in a developing country. **Theoretical, managerial and social contributions:** The study validated the models and the SLAM questionnaire to evaluate the organizational learning system in the public company. It enabled the mapping or the diagnosis of organizational learning system, with practical implications for strategic action in different areas of the company. In this sense, it can strengthen the company's adaptation, strategic renewal and sustainability. For the society, it can provide the benefits of greater efficiency and effectiveness in public service, continuous quality and innovation in meeting citizens' needs.

**Keywords:** Organizational learning. Strategic Learning Assessment Map (SLAM). Framework 4I. Stocks and flows of learning. Business performance.

## RESUMO

**Objetivo**: Descrever o sistema de aprendizagem organizacional, identificando a relação de estoques e fluxos de aprendizagem com o desempenho de negócio, na percepção dos empregados de uma empresa pública. **Metodologia:** O estudo replicou o modelo de Bontis et al. (2002) e testou um modelo alternativo com a inserção dos fluxos *feedforward* e *feedback*. Aplicou-se o questionário SLAM a uma amostra de 858 empregados de uma empresa pública do setor agrícola, aqui denominada AGRO. Análise dos dados foi realizada por meio de estatística descritiva e multivariada – modelagem de equações estruturais. **Resultados**: A confiabilidade dos construtos e os fatores componentes da escala foram atestados. Os dois modelos testados mostraram poder de explicação para a relação entre estoques e fluxos de aprendizagem com o desempenho de negócio. **Originalidade/relevância**: Esta pesquisa fortalece o conhecimento em pesquisas quantitativas para mensuração da aprendizagem organizacional, especificamente no contexto do serviço público, em um país em desenvolvimento. **Contribuições teóricas, para gestão e sociais:** O estudo validou os modelos e o questionário SLAM para avaliar o sistema de aprendizagem organizacional na empresa pública. Possibilitou o mapeamento, no formato de diagnóstico, dos processos de aprendizagem organizacional, com implicações práticas para a ação estratégica nas diferentes áreas da empresa, o que pode fortalecer a adaptação, a renovação estratégica e a sustentabilidade da empresa. Em âmbito social, pode ainda trazer benefícios de maior eficiência e eficácia no serviço público, de qualidade e inovação contínuas no atendimento das necessidades dos cidadãos.

**Palavras-chave:** Aprendizagem organizacional. Mapa Estratégico de Avaliação da Aprendizagem (SLAM). *Framework* 4I. Estoques e fluxos de aprendizagem. Desempenho de negócio.

## RESUMEN

**Objetivo:** Describir el sistema de aprendizaje organizacional, identificando la relación entre los stocks y flujos de aprendizaje con el desempeño empresarial, según la percepción de los empleados de una empresa pública. **Metodología:** El estudio replicó el modelo de Bontis et al. (2002) y probó un modelo alternativo con la inclusión de los flujos feedforward y feedback. Se aplicó el cuestionario SLAM a una muestra de 858 empleados de una empresa pública del sector agrícola, denominada aquí como AGRO. El análisis de los datos se realizó mediante estadística descriptiva y multivariada – modelo de Ecuación Estructural (MEE). **Resultados:** Se verificó la confiabilidad de los constructos y los factores componentes de la escala. Los dos modelos probados mostraron capacidad explicativa para la relación entre los stocks y flujos de aprendizaje con el desempeño empresarial. **Originalidad/relevancia:** Esta investigación fortalece el conocimiento en investigaciones cuantitativas para la medición del aprendizaje organizacional, específicamente en el contexto del servicio público, en un país en desarrollo. **Contribuciones teóricas, para la gestión y sociales:** El estudio validó los modelos y el cuestionario SLAM para evaluar el sistema de aprendizaje organizacional en la empresa pública. Permitió el mapeo, en formato de diagnóstico, de los procesos de aprendizaje organizacional, con implicaciones prácticas para la acción estratégica en las diferentes áreas de la empresa, lo que puede fortalecer la adaptación, la renovación estratégica y la sostenibilidad de la empresa. A nivel social, también puede traer beneficios de mayor eficiencia y eficacia en el servicio público, con calidad e innovación continuas en la atención a las necesidades de los ciudadanos.

**Palabras clave:** Aprendizaje organizacional. Mapa Estratégico de Evaluación del Aprendizaje (SLAM). Framework 4I. Stocks y flujos de aprendizaje. Desempeño empresarial.

## INTRODUCTION

Learning is an essential capability for individuals and organizations to adapt and survive in a global, complex, and unpredictable business environment (Alerasoul et al., 2022; Bontis et al., 2002; Chiva et al., 2007; Hael et al., 2024; Hermelingmeier & Wirth, 2021; Khoshfetrat et al., 2022; March, 1991; Oh, 2019; Rodríguez-Sánchez et al., 2021). Human beings develop learning by cultivating distinct patterns of action through active engagement with the environment and the ability to rationalize (AlSaied & Alkhoraif, 2024; Balasubramanian et al., 2022; Fiol & Lyles, 1985). Individual learning is inherent but not sufficient for organizational learning to occur (Choi, 2020). Individual experiences enhance organizational learning capacity when organizations provide opportunities for continuous learning, make resources available, and offer support and incentives for the use of new knowledge. Organizations learn through a dynamic process, whether intentional or not, regardless of adopting a systemic learning approach, but necessarily encompassing both individual and collective learning (Basten & Haamann, 2018; Hosseini et al., 2020; Kim, 1993).

Since the introduction of the term "organizational learning" in the 1960s, studies have been marked by multiple theoretical approaches and limited clarity (Castaneda et al., 2018; Cangelosi & Dill, 1965; Chiva & Alegre, 2005; Ramadam et al., 2024; Rodrigues et al., 2019; Versiani & Fischer, 2008). The different conceptions of organizational learning are characterized by processes of knowledge creation and acquisition (Castaneda et al., 2018), which lead to change as the organization gains experience (Argote & Miron-Spektor, 2011; Basten & Haamann, 2018; Real et al., 2014). New knowledge can be assimilated through various repositories, such as individuals, structure, culture, routines, tools, systems, social networks, and memory (Argote & Miron-Spektor, 2011).

By exploring the notion of how individual learning fosters learning at the collective level and by proposing a unifying structure of organizational learning named the 4I Framework, Crossan et al. (1999) advanced the studies on the subject (Popova-Nowak & Cseh, 2015). In this approach, organizational learning is understood as learning stocks at different levels -individual, group, and organizational - processed through the tension between the creation of new knowledge (feedforward learning flows) and the use of existing knowledge (feedback learning flows), both of which are critical elements for strategic renewal (Bontis, 1999; Bontis et al., 2002; Crossan et al., 1999, 2011).

The 4I Framework was operationalized by Bontis (1999) and Bontis et al. (2002) in the Strategic Learning Assessment Map (SLAM). These authors developed and validated a scale to assess how the dimensions of organizational learning stocks and flows of learning are associated with business performance. Different results were found in studies that applied the original scale and/or its adaptations, highlighting the need for further research (Berson et al., 2015; Dicle & Köse, 2014; Feng et al., 2021; Garza Burgos et al., 2022; Hariharan & Anand, 2023; Jyothibabu et al., 2010; Mainert et al., 2018; Oh, 2019; Real et al., 2006, 2014; Wong & Huang, 2011). In Brazil, the model was validated by Bido et al. (2010) and Valentin (2010).

As pointed out by Feng et al. (2021), there is still limited research on the measurement of organizational learning. Wang et al. (2024) suggest cross-level analyses that integrate individual, team, and organizational dynamics to observe how they interact with each other and provide a more comprehensive understanding. Studies indicate a demand for investigations into the potential of organizational learning to improve public administration outcomes, since most studies focus on the private sector, and there is also a shortage of research in emerging economies (Anand & Brix, 2022; Cuffa & Steil, 2019; Hamblin et al., 2024; Jarvie & Stewart, 2018; Olejarski et al., 2019). Looks et al. (2024) and Wilson et al. (2023) advocate for future studies on how the structure of learning processes supports adaptation and continuous learning in public services. Literature gaps concerning developing countries, whose markets and economic conditions differ from those of developed countries, are also highlighted by Chan et al. (2024) and Inthavong et al. (2023). For greater integration in research, Anand and Brix (2022) suggest the use of methods similar to those already operationalized.

From these reflections and gaps, this article seeks to answer the following question: What is the relationship between learning stocks and flows and business performance in a public company? The objective was to describe the organizational learning system by identifying the relationship between learning stocks and flows and business performance, from the perspective of employees in a public company. A quantitative survey study was conducted through the replication of the scale developed and validated by Bontis et al. (2002), as well as the proposal of an alternative model, with a sample of 858 employees from the technical area (core activity) and the administrative area (support/operational and managers) of a public company that provides services in the agricultural sector, here referred to as AGRO.

Given the need for public organizations to do more with less (Olejarski et al., 2019, p. 1), the conclusions of this study may guide investment decisions regarding the scarce public resources available to enhance learning capacity. Furthermore, research on organizational learning can contribute to strengthening policies and the sustainable development of public organizations (Bianchi et al., 2022; Lenart-Gansiniec & Sułkowski, 2020).

The findings of this study provide four main contributions to the advancement of research on organizational learning, combining theoretical and practical pathways. First, by describing the results of replicating the quantitative study of Bontis et al. (2002) in a single company, considering respondents at all levels in order to represent the organizational learning system. Second, by exploring and examining the potential of the proposed model within the specificity of the public service context in a developing country (emerging economy). Third, by addressing the demand for the validation of organizational learning measurement instruments through the testing of an alternative model. And fourth, by enabling a diagnosis of the organizational learning system in the company studied.

In addition to this introduction, the following sections of the article present the theoretical framework, methodology, presentation and discussion of the results, conclusion, and references.

## THEORETICAL FRAMEWORK

Despite advances since the conception of organizational learning, concepts, theories, and perspectives have been developed heterogeneously across various disciplines and schools of thought (Castaneda et al., 2018; Cangelosi & Dill, 1965; Rodrigues et al., 2019; Versiani & Fischer, 2008). Over the course of these studies, the functionalist perspective (paradigm) has predominated (Argyris & Schön, 1978, 1996; Bontis et al., 2002; Cangelosi & Dill, 1965; Castaneda et al., 2018; Elkjaer, 2022; Levitt & March, 1988; March, 1991; Popova-Nowak & Cseh, 2015). Organizations are understood as hierarchical structures with defined boundaries, oriented toward the development of new products and services and the improvement of performance. Organizational learning is viewed as a means to foster performance that can be predicted and controlled (Elkjaer, 2022).

In the 1990s, the constructionist perspective (paradigm) gained ground (Brown & Duguid, 1991; Popova-Nowak & Cseh, 2015). Organizations came to be understood as a multiplicity of simultaneous situations or practices that generate learning and knowledge circulating in multiple directions, not confined to individuals' minds or to structures and systems (Elkjaer, 2022; Popova-Nowak & Cseh, 2015). This sociocultural approach emphasizes the context in which learning occurs as a social process, in which individuals actively participate in situated collective practices and discourses (Argyris & Schön, 1978; Castaneda et al., 2018; Popova-Nowak & Cseh, 2015).

According to Popova-Nowak and Cseh (2015), some studies lie in the transitional zone between the functionalist and constructionist perspectives, such as the 4I Framework on organizational learning developed by Crossan et al. (1999, 2011). By viewing the organization as more than the sum of individuals, and by emphasizing the transition of knowledge from the individual to the group and then to the organization, the 4I Framework encompasses a set of concepts grounded in four premises. The first considers that organizational learning involves a tension between assimilating new learnings/knowledge (exploration) and employing what has already been learned (exploitation), as a constant and simultaneous flow and counterflow of ideas and actions (feedforward and feedback flows). The second premise presents organizational learning as a multilevel phenomenon individual, group, and organizational. The third asserts that the three levels of analysis are linked by social and psychological processesintuition, interpretation, integration, and institutionalization (the 4Is). The fourth premise establishes that cognition affects action and vice versa, moving beyond the dichotomy between cognition and collective behavior.

Therefore, Crossan et al. (1999, 2011) consider learning and renewal as encompassing the entire organization. Although there is no clear boundary between the four social and psychological processes, since they occur across interacting levels, the processes of intuiting and interpreting are predominantly associated with the individual level; interpreting and integrating with the group level; and integrating and institutionalizing with the organizational level. In this way, institutionalized learning is captured and embedded at the organizational level in the form of non-human elements such as products, processes, strategies, rules, procedures, structures, systems, and routines (Crossan et al., 1999, 2011).

This framework incorporates the two types of learning proposed by March (1991), referred to as exploitation and exploration, as well as the theoretical model of single-loop and double-loop learning developed by Argyris and Schön (1978, 1996). To foster organizational learning, organizations must exploit existing knowledge (continuity through incremental improvements—exploitation) via single-loop learning, while at the same time exploring new ideas and learning new ways (transformational change exploration) via double-loop learning. The learning processes, dynamic and interrelated by nature, generate two movements: feedforward, the acquisition of new learnings and actions that flow from the individual to the group and the organization; and feedback, when what has been learned originates at the organizational level and flows back to the group and the individual (Crossan et al., 1999, 2011). Exploration and exploitation each have a positive and significant effect on innovative performance, and their simultaneity (ambidexterity) amplifies this effect, which is critical for organizational sustainability (AlSaied & Alkhoraif, 2024; Patwary et al., 2024; Tian et al. 2021).

Based on the 4I Framework, Bontis et al. (2002) developed the Strategic Learning Assessment Map (SLAM). These authors present a comprehensive view of organizational learning, offering a unifying perspective for multilevel analysis of the processes through which learning occurs, and propose the operationalization of the constructs and the validation of a scale.

Thus, organizational learning is defined as a dynamic process that encompasses the relationship between learning stocks and flows in a multilevel perspective, simultaneously involving both feedforward and feedback flows, enabling the organization to improve its performance and achieve strategic renewal. Stocks refer to the learning that occurs at different levels and concern the way knowledge is created, retained, and transferred (Argote & Hora, 2017; Argote & Miron-Spektor, 2011; Yang et al., 2004). This learning takes place through the four processes described in the 4I Framework. The transfer of learning from the individual level to the group and organizational levels, and vice versa, promoting learning within organizations, corresponds to the learning flows that arise from the tension among the three levels. Flows relate to the way knowledge is managed within organizations (Bontis, 1999; Bontis et al., 2002; Crossan et al., 1999, 2011).

The scale tested and validated by bontis et al. (2002) assesses perceptions of learning stocks and flows at the individual, group, and organizational levels, as well as misalignment measured as the difference between stocks and flows and how these are associated with business performance. misalignment suggests that there is learning that is not being absorbed by the organization, creating bottlenecks that affect the efficiency and effectiveness of the organizational learning system (Bontis, 1998, 1999; Bontis et al., 2002).

The scale consisted of 10 items for each of the five theoretical constructs of SLAM (three learning stocks and two flows) and 10 items for measuring business performance, related to performance indicators at the individual level (employee satisfaction and happiness), the group level (team functioning; deliveries and their contribution to goal achievement), and the organizational level (corporate success and credibility; future prospects; meeting customer needs).

Over time, the theme of performance has been widely researched under different terminologies and approaches: business performance, or-

ganizational performance, corporate performance, departmental performance, individual performance, task performance, and so forth (Carpini et al., 2017; Hansen & Wernerfelt, 1989; Manfredi Latilla et al., 2018; Matitz & Bulgacov, 2011; Inthavong et al., 2023). Despite being an extensively used construct in management research, there is no universal empirical theory regarding its measurement. The construct and concept of performance are multidimensional in nature, and studies often adopt indicators and variables without presenting a robust theoretical discussion to support them (Matitz & Bulgacov, 2011).

Venkatraman and Ramanujam (1987) emphasize the relationship between financial and non-financial benefits derived from strategic planning. Hansen and Wernerfelt (1989) highlight two sets of factors economic and organizational components (behavioral and sociological paradigms) as important and independent in explaining performance, valuing both instead of relying on a unidirectional perspective.

According to Borman and Motowidlo (1993) and Campbell et al. (1996), individuals' behaviors and attitudes at work generate results that ultimately define performance. Kell and Motowidlo (2012) advance this discussion by distinguishing between indicators related to behavior, performance, and outcomes. A general concept of performance, for McKenny et al. (2018), is related to the extent to which an organization succeeds in achieving its goals.

Among the different approaches to performance, Bontis et al. (2002) assessed individual, group, and organizational outcomes, validated by comparing the factor scores of these items with an objective measure Return on Revenue (ROR) and found a positive and significant relationship. Authors such as Venkatraman and Ramanujam (1987), Hansen and Wernerfelt (1989), and Chiva et al. (2007) recognize that subjective measures strongly correlate with objective measures of financial performance.

There has also been some confusion arising from the translations of the term *business performance* from English into Portuguese. In the publication by Bontis et al. (2002), it was at times translated as *organizational performance*, *business performance*, or *company performance*. In this study, the option was to use *business performance*, given the indicators employed to evaluate the construct, which focus on individual, group, and organizational outcomes.

The final study by Bontis et al. (2002) included a sample of 32 Canadian mutual fund companies registered with the Investment Funds Institute of Canada (IFIC), totaling 480 questionnaires. The data were analyzed using structural equation modeling with PLS (Partial Least Squares). The results of the hypothesis tests (evaluation of the structural model) supported the premise that there is a positive relationship between learning stocks at all organizational levels and business performance. Moreover, the proposition that misalignment between stocks and flows in an overall organizational learning system is negatively associated with business performance was also supported (Bontis et al., 2002).

Thirteen studies were identified that applied the scale developed by Bontis et al. (2002), either in its original or adapted form, predominantly in private sector companies: Berson et al. (2015) in Israel; Dicle and Köse (2014) in Turkey; Feng et al. (2021) in China; Garza Burgos et al. (2022) in Mexico; Hariharan and Anand (2023) and Jyothibabu et al. (2010), both in India; Mainert et al. (2018) in Germany; Oh (2019) in Korea; Real et al. (2006, 2014) in Spain;

Wong and Huang (2011) in Taiwan; as well as studies conducted in Brazil by Bido et al. (2010) and Valentin (2010).

Some of these studies confirmed the relationship between the constructs, partially or fully supporting the findings of Bontis et al. (2002). In Bido et al. (2010), Bontis et al. (2002), Feng et al. (2021), Jyothibabu et al. (2010), and Valentin (2010), the results indicate a stronger impact of organizational-level learning stocks on performance. Jyothibabu et al. (2010) provided empirical evidence that individual- and organizational-level learning are directly associated with performance, although mediated by group-level learning. Based on the analysis of these studies, the following hypotheses were developed:

*H1: The learning stock at the individual level is positively associated with business performance.*

*H2: The learning stock at the group level is positively associated with business performance.*

*H3: The learning stock at the organizational level is positively associated with business performance.*

*H4: The misalignment between learning stocks and flows is negatively associated with business performance.*

Other studies have tested and/or found results different from those of Bontis et al. (2002). These same authors tested an alternative model to examine the effects of including feedforward and feedback learning flows on performance. As discussed in Oh (2019), although studies have verified the influence of learning stocks and flows on business performance, few have examined the individual effect of feedforward and feedback flows.

These reflections supported the proposition of an alternative model to evaluate the organizational learning system, considering the inclusion of feedforward and feedback learning flows and their effect on business performance. The following hypotheses were therefore developed for the alternative model:

*H5: The learning stock at the individual level is positively associated with feedforward and feedback flows.*

*H6: The learning stock at the group level is positively associated with feedforward and feedback flows.*

*H7: The learning stock at the organizational level is positively associated with feedforward and feedback flows.*

*H8: Feedforward and feedback learning flows act jointly and simultaneously on business performance.*

These models were empirically tested using the methodology presented in Section 3.

## METHODOLOGY

Given the objective of this research, a quantitative, descriptive, survey-type study was chosen (Collis & Hussey, 2021; Creswell & Creswell, 2018). The research was conducted in August 2023 in a public company, a pioneer in the country and a national reference in the agricultural sector, here referred to as AGRO to preserve anonymity and ethical confidentiality. The sample was non-probabilistic, with the questionnaire sent online via Google Forms to the institutional emails of 1,674 active employees from both the technical area (the company's core activity) and the administrative area (support/operational staff and managers). A total of 858 valid responses were received, representing an overall response rate of 51.25%.

Among the respondents, the age group between 45 and 55 years was the most frequent (32.2%), with 84.4% being over 35 years old, indicating maturity. Regarding education level, more than half (51%) reported having a specialization degree, 15.5% a master's degree, and 5.0% a doctoral degree. As for tenure at AGRO, 63.4% had been employed for more than 15 years, while more recent hires (up to 5 years) accounted for 30.3% of the sample. Regarding professional area, 646 respondents (75.3%) were from the technical area (core activity), while 178 (20.7%) were from the administrative support/operational area, and 34 (4%) were managers.

In this study, the questionnaire developed and validated by Bontis et al. (2002) was replicated. In Brazil, the complete version of this instrument was validated by Bido et al. (2010) and Valentim (2010) through the following stages: back-translation from English to Portuguese, then into English, and again into Portuguese by two independent translators; submission for content and semantic validation by 20 experts and other professionals; and a pilot test. Data analysis was performed using structural equation modeling with PLS-PM estimation (Partial Least Squares – Path Modeling).

Prior to applying the questionnaire at AGRO, a pre-test was conducted with the Human Resources Department manager and ten professionals from a multidisciplinary committee representing both technical and administrative areas across different company units. The pre-test was carried out under the same conditions as the actual application and evaluated the clarity and comprehension of the questions, as well as the time required to complete the survey. Some words and expressions were adjusted to fit AGRO's context.

The questionnaire consisted of 60 statements on a seven-point Likert scale, measuring five constructs related to the characterization of the organizational learning system (learning stocks at the individual, group, and organizational levels, along with feedforward and feedback flows) and one construct for business performance. A misalignment variable was calculated as the difference between the mean of the learning stocks and the mean of the learning flows.

Data were analyzed using univariate and multivariate statistical techniques, in line with the research objectives. The software used included Microsoft Excel, SmartPLS version 4.0 with the PLS method (Partial Least Squares), and SPSS 15 (Statistical Package for the Social Sciences) (Hair et al., 2014).

Initially, an exploratory analysis of the data was carried out, focusing on missing data and outliers (Hair et al., 2014). No missing data were found for the constructs overall, and most questionnaires did not present univariate

outliers. Using the Mahalanobis distance method, 13 multivariate outliers were identified; however, they did not affect the final results. None of these cases were excluded, as their removal could lead to the loss of relevant information, especially since there was no evidence that the outliers disproportionately influenced the results.

The data were analyzed through structural equation modeling (SEM), encompassing both the measurement model (outer model) and the structural model (inner model). In the measurement model, confirmatory factor analysis was conducted; the dimensions and constructs were examined in terms of convergent validity, discriminant validity, and reliability. In the structural model, a correlation matrix among the constructs was performed to verify whether they were related as predicted by the theory (Hair et al., 2014).

## PRESENTATION AND DISCUSSION OF RESULTS

This section covers the diagnosis of the organizational learning system at AGRO, based on descriptive statistics, as well as the analyses of the scale and of the proposed structural and alternative models, using Structural Equation Modeling.

This study examined the estimates of mean, median, and standard deviation for the dimensions of the constructs in order to understand response patterns and respondents' perceptions of Organizational Learning at AGRO. For interpretation purposes, mean values between 1.0 and 3.0 were considered low, between 3.1 and 5.0 medium, and between 5.1 and 7.0 high, as presented in Table 1. The frequency distribution is also shown.

**Table 1**

*Measures of Central Tendency and Frequency Distribution by Construct*

| Construct | Measures | | | Frequency | | |
|---|---|---|---|---|---|---|
| | Mean | Median | SD | Low | Mean | High |
| Learning Stock – Individual Level | 5,1 | 5,2 | 1,0 | 4,1% | 40,0% | 55,9% |
| Learning Stock – Group Level | 4,9 | 5,1 | 1,2 | 7,3% | 41,8% | 50,8% |
| Learning Stock – Organizational Level | 4,8 | 5,0 | 1,2 | 9,4% | 42,7% | 47,9% |
| Learning Flows – Feedforward | 4,6 | 4,8 | 1,1 | 11,3% | 51,5% | 37,2% |
| Learning Flows – Feedback | 4,2 | 4,4 | 1,2 | 17,8% | 56,2% | 26,0% |
| Business Performance | 5,3 | 5,4 | 1,0 | 2,6% | 29,5% | 67,9% |

Overall, the mean results indicated a favorable trend in the responses, and the standard deviation values reflected a high level of agreement among respondents, meaning low dispersion around the mean. The highest mean was observed for the Business Performance construct (5.3), followed by the Individual-Level Learning Stock (5.1). In contrast, the Feedback Learning Flow showed the lowest mean (4.2) and the lowest median. Among the low-rated assessments, the Feedback Learning Flow and the Feedforward Learning

Flow stood out, with 17.8% and 11.3% of respondents, respectively, assigning scores between 1 and 3.

For the multivariate analysis, compliance tests were conducted to ensure that the data collection instrument was reliable and valid. To assess whether the study data followed a normal distribution, two measures were used: kurtosis and skewness. The results indicated a distribution flatter than the normal distribution. The Jarque-Bera test revealed a significant deviation from normality of the indicators (Jarque & Bera, 1987). Harman's single-factor test was conducted to evaluate the presence of common method bias, indicating that the cumulative percentage of variance explained by a single factor was 42.9%, which did not exceed half of the total variance of all constructs. This result suggests the absence of common method bias (Podsakoff et al., 2003).

The constructs showed favorable conditions for exploratory factor analysis (EFA), as recommended by Hair et al. (2014) and Malhotra and Birks (2007). Regarding dimensionality, only the Business Performance construct presented two dimensions, after the exclusion of two items. This differs from Bontis et al. (2002), in which the items clustered into a single main factor, and from Real et al. (2006, 2014), in which the performance items loaded onto three factors in the confirmatory factor analysis. For communalities, all variables reached the minimum desirable threshold, except for eight items, which were excluded from the analyses to improve construct fit.

In the measurement model analysis, following Hair et al. (2014), for convergent validity, the minimum factor loading levels (above the acceptable threshold of 0.50) and significance in T-tests adequate at the 1% significance level (two-tailed), that is, an absolute T value greater than 2.60 were achieved for all variables in this study.

**Table 2**

*Indicators of Reliability Analysis and Other Measurements*

| Constructs (including second-order) | Items | AVE[1] | A.C.[2] | C.C.[3] | KMO[4] | Dim.[5] |
|---|---|---|---|---|---|---|
| Performance | 2 | 0,79 | 0,73 | 0,88 | 0,85 | 2 |
| - Performance 01 | 5 | 0,67 | 0,88 | 0,91 | * | 1 |
| - Performance 02 | 3 | 0,71 | 0,80 | 0,88 | * | 1 |
| Individual Stock | 9 | 0,53 | 0,89 | 0,91 | 0,90 | 1 |
| Group Stock | 9 | 0,64 | 0,93 | 0,94 | 0,94 | 1 |
| Organizational Stock | 9 | 0,64 | 0,93 | 0,94 | 0,91 | 1 |
| Feedback Flow | 9 | 0,57 | 0,90 | 0,92 | 0,91 | 1 |
| Feedforward Flow | 8 | 0,63 | 0,92 | 0,93 | 0,92 | 1 |
| Misalignment | 1 | * | * | * | * | 1 |

**Note.** * not computable

For all constructs, the values obtained were above the minimum desirable thresholds (Hair et al., 2014; Malhotra & Birks, 2007): AVE greater than 0.50 suggests adequate convergence; Cronbach's Alpha (C.R.[2]) greater than 0.70; Composite Reliability (C.C.[3]) greater than 0.88; and the Kaiser-Meyer-Olkin

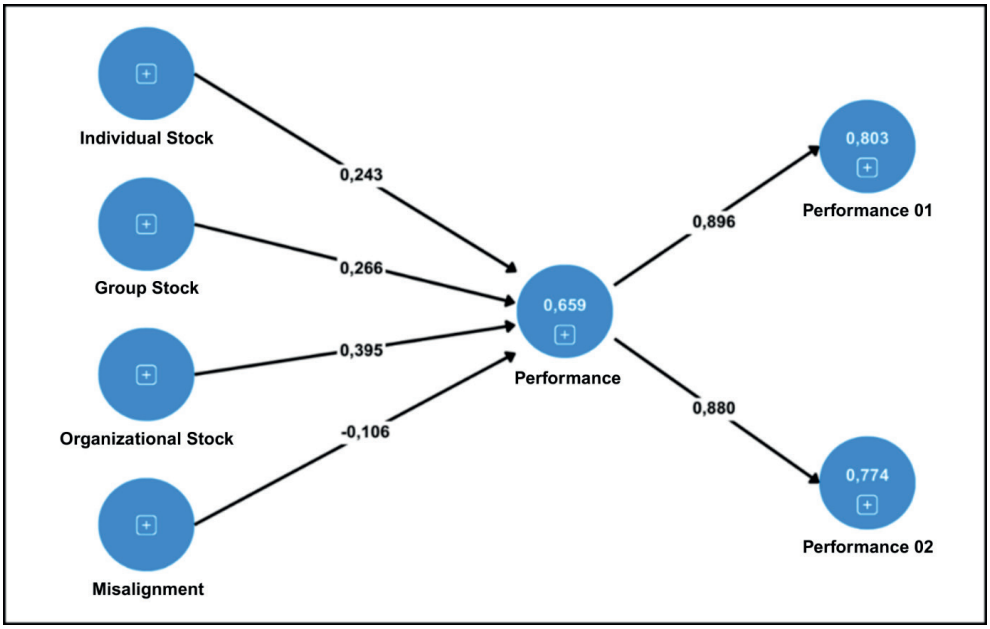
measure of sampling adequacy (KMO[4]) above 0.70. Therefore, the reliability of the constructs was confirmed. The Business Performance construct presented two dimensions (Performance 01 and Performance 02) in the EFA.

Misalignment is composed of a single variable and therefore has no indicators. A model was estimated in which all constructs were correlated (CFA – Confirmatory Factor Analysis). Based on the factor scores obtained, misalignment was calculated as the difference between the mean of the learning stocks and the mean of the learning flows, resulting in a single indicator used in the structural model (Bontis et al., 2002).

The main Structural Model (inner model) is presented in Figure 1, considering the replication of the model proposed by Bontis et al. (2002).

**Figure 1**

*Main Structural Model – Replication of the Bontis et al. Model (2002)*




**Note.** The Business Performance construct presented two dimensions (Performance 01 and Performance 02) in the exploratory factor analysis (AFE).

The $R^2$ value of 0.659 for Performance indicates that the model is able to explain 65.9% of the variability in Business Performance. To verify the significance of the relationships, a Bootstrapping test with 5,000 resamples was performed. In terms of the relationships tested, the weights, standard error, T-tests, significance, and results are presented in Table 3.

**Table 3**

*Results of the Structural Model Relationships*

| Relações | β | I.C. | S.E. (β) | T (2,59) | p-value | Result |
|---|---|---|---|---|---|---|
| H1 – Individual Stock → Performance | 0,24 | 0,18 ↔ 0,31 | 0,03 | 7,55 | 0,00 | Signif. |
| H2 – Group Stock → Performance | 0,27 | 0,20 ↔ 0,33 | 0,04 | 7,60 | 0,00 | Signif. |
| H3 – Organizational Stock → Performance | 0,40 | 0,33 ↔ 0,46 | 0,04 | 11,45 | 0,00 | Signif. |
| H4 – Misalignment → Performance | -0,11 | −0,15 ↔ −0,06 | 0,02 | 4,42 | 0,00 | Signif. |
| Performance → Performance 01 | 0,90 | 0,88 ↔ 0,91 | 0,01 | 127,53 | 0,00 | Signif. |
| Performance → Performance 02 | 0,88 | 0,86 ↔ 0,9 | 0,01 | 96,04 | 0,00 | Signif. |

**Note.** β is the standardized weight; T is the t-value; S.E.(β) is the standard error; C.I.-95% is the confidence interval given by β ± 1.96 * S.E.(β); p-value is the significance of T for the sample of 858 cases, based on a two-tailed test.

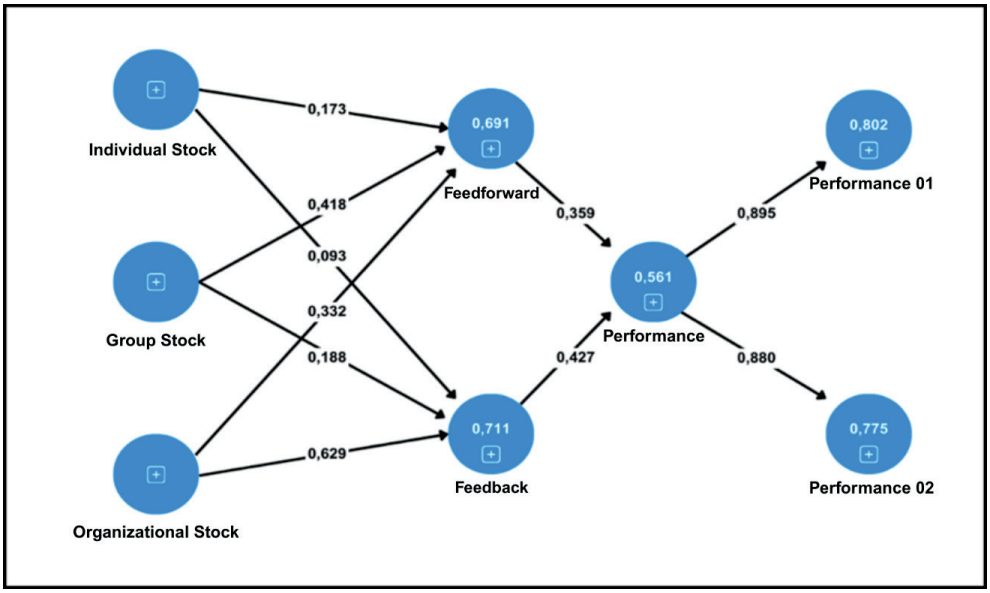
The results indicated that all relationships were significant ($p < 0.001$). A GOF (Goodness of Fit) of 66.1 was obtained, which, together with an SRMR (Root Mean Square Residual) below 0.08 and with the d_ULS and d_G results included within the confidence interval provided by bootstrapping, confirms the validity of the findings.

The four hypotheses of the study (H1 to H4) were confirmed: learning stocks at the individual, group, and organizational levels are positively associated with business performance. The association between Misalignment and Performance was −0.11 ($\beta$), negative and significant ($p < 0.001$). Thus, the greater the Misalignment, the lower the Business Performance tends to be. This finding is also reported in the studies of Bontis et al. (2002), Feng et al. (2021), and Valentin (2010).

An alternative model (Figure 2) was tested to evaluate the organizational learning system, considering the inclusion of feedforward and feedback learning flows and their effect on business performance.

**Figure 2**

*Alternative model*




The $R^2$ value for Performance was 0.561, which means that the model is able to explain 56.1% of the variability in Business Performance. Table 4 presents the results of the relationships tested: weights, standard error, T-tests, and significance.

**Table 4**

*Results of the Alternative Model Relationships*

| Relationships | B | C.I. | S.E. (β) | T (2,59) | p-value | Result |
|---|---|---|---|---|---|---|
| *H5 – Individual → Feedforward* | 0,17 | 0,11 ↔ 0,23 | 0,03 | 5,55 | 0,00 | Significant |
| *H5 – Individual → Feedback* | 0,09 | 0,04 ↔ 0,15 | 0,03 | 3,24 | 0,00 | Significant |
| *H6 – Group → Feedforward* | 0,42 | 0,35 ↔ 0,49 | 0,04 | 11,88 | 0,00 | Significant |
| *H6 – Group → Feedback* | 0,19 | 0,13 ↔ 0,24 | 0,03 | 6,45 | 0,00 | Significant |
| *H7 – Organizational → Feedforward* | 0,33 | 0,26 ↔ 0,40 | 0,04 | 9,62 | 0,00 | Significant |
| *H7 – Organizational → Feedback* | 0,63 | 0,57 ↔ 0,69 | 0,03 | 21,77 | 0,00 | Significant |
| H8 – Feedforward → Performance | 0,36 | 0,28 ↔ 0,44 | 0,04 | 8,85 | 0,00 | Significant |
| H8 – Feedback → Performance | 0,43 | 0,35 ↔ 0,50 | 0,04 | 11,06 | 0,00 | Significant |
| Performance → Performance 01 | 0,90 | 0,88 ↔ 0,91 | 0,01 | 123,40 | 0,00 | Significant |
| Performance → Performance 02 | 0,88 | 0,86 ↔ 0,90 | 0,01 | 98,53 | 0,00 | Significant |

**Note.** β is the standardized weight; T is the t-value; S.E.(β) is the standard error; C.I.-95% is the confidence interval given by β ± 1.96 * S.E.(β); p-value is the significance of T for the sample of 858 cases, based on a two-tailed test.

All relationships were significant ($p < 0.001$). In addition, the model presented a GOF of 67.6%, and the confidence intervals obtained through the Bootstrapping test were consistent with the p-value results. The findings indicated an excellent model fit, as the SRMR was below 0.08 and the d_ULS and d_G results were within the confidence interval provided by bootstrapping. Therefore, the validity of the results for the alternative model is confirmed, as well as the study hypotheses (H1 to H4 and H5 to H8).

## DISCUSSION OF RESULTS

The surveyed sample of 858 respondents suggests maturity and a high level of experience within the group (84.4% over 35 years old and 63.4% with more than 15 years at the company), proving to be representative of AGRO's population. The sample composition included different hierarchical levels and areas of the company, meeting the recommendations of Albuquerque and Teixeira (2016), Bontis (1999), Bontis et al. (2002), Rodrigues et al. (2019), and Valentin (2010), as a calibration mechanism "through the eyes of the individuals who are part of the organizational learning system (Bontis, 1999, p. 14).

The analysis of AGRO employees' perceptions, when assessing how learning occurs at each level (stocks) and between levels (flows), as well as its association with business performance, suggests both strengths and areas for improvement in the organizational learning system. The three levels of learning stocks received favorable evaluations. The two constructs, Feedforward Learning Flow and Feedback Learning Flow, scored below the overall mean (4.8), while the Business Performance construct obtained the highest mean (5.3) compared to the others in the questionnaire.

In the measurement model analysis, the reference values for convergent validity and reliability of the dimensions and constructs under study were achieved. Discriminant validity showed that the indicators represented distinct dimensions, except for the pairs Feedforward × Feedback and Organizational Stock × Feedback, which displayed similarities. The confirmatory factor analysis results in Bontis et al. (2002), Feng et al. (2021), and Mainert et al. (2018) indicated that the Feedforward and Feedback constructs seemed to be strongly correlated with each other. In the study by Bontis et al. (2002), the justification was that this does not constitute a major concern, since Feedforward and Feedback are not directly used in the model, as their measures are combined to form misalignment. This reasoning also guided Feng et al. (2021), Mainert et al. (2018), and the present research at AGRO in the Main Model replicating Bontis et al. (2002).

Two dimensions were identified for Business Performance in the EFA. Therefore, following the proposition of Chin and Dibbern (2010), the second-order factor approach was applied, in which the variables of first-order dimensions are incorporated as means into the higher-order construct.

In the main structural model, learning stocks at all three levels had a positive and significant association with Business Performance at AGRO, as expected (H1, H2, and H3). The Organizational-Level Learning Stock showed the strongest effect on Business Performance, followed by Group-Level Learning Stock, and finally by Individual-Level Learning Stock. The stronger effect of Organizational-Level Learning Stock on Business Performance was also

observed in other studies (Bido et al., 2010; Bontis et al., 2002; Feng et al., 2021; Jyothibabu et al., 2010; Valentin, 2010). The structural model demonstrated substantial explanatory power for business performance variability (65.9%).

The results also revealed the existence of misalignment between learning stocks and flows (–0.106), confirming hypothesis H4 the significant and negative relationship with business performance. This negative association was also found in the studies of Bontis et al. (2002), Feng et al. (2021), and Valentin (2010), although Bido et al. (2010) did not identify a misalignment effect. The finding at AGRO highlights barriers and bottlenecks in the organizational learning system, indicating that learning is not being fully absorbed by the company; in other words, there is knowledge stock that is not flowing, which undermines the organizational learning system.

The evidence highlights the need for institutional action to address the challenges of coordinating and intensifying the use of individual and group knowledge, as well as advancing the extent to which the company absorbs, leverages, and incorporates such knowledge. This requires evaluating the effectiveness of personnel development policies and programs, addressing sociopsychological aspects, and assessing how organizational culture is managed to foster learning processes and knowledge management for continuous improvement of public services, innovation, and organizational adaptation.

This study sought to move forward by proposing an Alternative Model that included feedforward and feedback flows. The results differed from those found by Bontis et al. (2002) when they examined the effects of inserting these flows into the PLS model. In their study, these variables were not initially part of the hypothesis development but were nonetheless tested. Their results did not indicate a significant coefficient for the Feedforward Learning Flow. In addition, the coefficient for Organizational-Level Learning Stock lost its substantive effect. The proposition of the alternative model was also supported by Garza Burgos et al. (2022), who included the constructs in their model but likewise did not find a significant impact of either Feedforward or Feedback Learning Flow on Business Performance. These constructs still require deeper investigation, as research results suggest potential issues; it can be inferred that the concept and/or the measurement variables of these constructs may not be fully adequate.

In this research, with the alternative model, feedforward and feedback flows acted jointly and simultaneously on business performance, influencing it positively and significantly. The association of feedback with Business Performance was stronger than that of feedforward. These results confirm that the tension between feedforward and feedback learning flows is critical for strategic renewal (Bontis, 1999; Bontis et al., 2002; Crossan et al., 1999) and may indicate an organizational context favorable to the development of ambidexterity (AlSaied & Alkhoraif, 2024; Patwary et al., 2024; Tian et al., 2021).

The findings also show that, at AGRO, Organizational-Level Learning Stock is more strongly associated with the Feedback Learning Flow. This reinforces the importance of institutionalizing knowledge so that it remains available, accessible, and effectively used within the company, a condition that enables the feedback learning flow to influence knowledge stocks at the group and individual levels.

Another result for AGRO, derived from the alternative model, is the strong influence of Group-Level Learning Stock on the Feedforward Learning Flow. It is through group-level integration that meaning is created, shared understanding is shaped, and mutual adjustments among group members occur. This dialogue and coordinated action at the group level enable the feedforward learning flow. AGRO must therefore reflect on whether new ideas, new actions, and new ways of doing things are being encouraged internally, whether support and incentives are provided and sufficient, and to what extent knowledge sharing among individuals is promoted, with the goal of increasing feedforward learning flow and driving innovation.

The use of the Bontis et al. (2002) scale provided a comprehensive view of the organizational learning system at AGRO as a dynamic process. It proved to be an appropriate tool, generating cumulative results that deepen understanding of the topic, bridge theory and practice with a more instrumental perspective, and point to avenues for future research (Argote et al., 2021; Basten & Haamann, 2018; Neves & Steil, 2019).

Finally, by investigating a public sector company in a developing country, this research responds to the recommendations of several authors (Anand & Brix, 2022; Chan et al., 2024; Cuffa & Steil, 2019; Hamblin et al., 2024; Inthavong et al., 2023; Jarvie & Stewart, 2018; Looks et al., 2024; Olejarski et al., 2019;  e Wilson et al., 2023).

## CONCLUSION

This study aimed to describe the organizational learning system by identifying the relationship between learning stocks and flows and business performance, from the perspective of employees in a public company, here referred to as AGRO, in an emerging economy. The questionnaire developed and validated by Bontis et al. (2002) was replicated with a sample of 858 employees from different areas and hierarchical levels.

The research confirms that the SLAM scale is robust, reliable, and appropriate for understanding the reality of organizational learning, as it was able to explain the proposed relationships. Two models were tested: the main structural model, replicating the study by Bontis et al. (2002), and the alternative model, which included feedforward and feedback learning flows.

The main structural model demonstrated a strong ability to explain the variability in Business Performance. A positive and significant association was confirmed between learning stocks at the three levels and business performance. The findings at AGRO corroborated previous studies, allowing the conclusion that the contribution of organizational-level learning to business performance is greater than that of group- and individual-level learning. Misalignment between learning stocks and flows at AGRO, indicated by a significant negative association with business performance, confirmed the existence of knowledge that is not being absorbed by the company, representing an obstacle to the organizational learning system.

In the alternative model, the percentage of explained variability in Business Performance was substantial, although lower than in the main model. The study advanced scientific knowledge by testing and confirming that each of the three levels of learning stocks is positively and significantly

associated with each of the flows, and that the flows, in turn, simultaneously and significantly impact business performance. Feedback flow showed a stronger association with performance, highlighting the need for AGRO to reflect on how non-human repositories (organizational level) are managed, given their potential to feed knowledge at group and individual levels. Another key finding was the strong influence of Group-Level Learning Stock on the Feedforward Learning Flow, demonstrating the strategic role of teams in catalyzing new ideas and practices.

In addition to strengthening the field of quantitative research for measuring organizational learning systems, this study offered a practical contribution by mapping, in diagnostic form, the organizational learning processes at AGRO and the tension between assimilating new knowledge (exploration) and leveraging or applying what has already been learned (exploitation). In this way, it generates implications for the strategic actions of managers and professionals working in different areas of the company, with the aim of improving dynamic learning processes and, consequently, enhancing performance, adaptability, and strategic renewal.

With regard to social contributions, this investigation reinforces organizational learning as a vehicle for improving the implementation of public policies and achieving superior performance. It indicates that organizational learning can provide society with the benefits of greater efficiency and effectiveness in public service, as well as continuous quality and innovation in meeting citizens' needs.

As a limitation, it should be noted that the results of this study are specific to AGRO and cannot be generalized to other contexts. Another aspect concerns the cross-sectional nature of the data. It should also be highlighted that this research did not explore or discuss the formula for calculating misalignment in pursuit of greater effectiveness in measuring this variable. Furthermore, it did not provide an in-depth discussion of the items that characterize business performance in a public company or of the items related to feedforward and feedback learning flows.

It is suggested that longitudinal studies be conducted to investigate the impact of organizational learning on business performance over time. Replication in other public companies is also recommended, in order to reinforce and verify potential differences in comparison with organizational learning systems in private companies. Considering that the alternative model presented results different from those of previous studies regarding the inclusion of the Feedforward and Feedback constructs, future research should replicate this model to further explore the relationships identified. Another avenue is to refine the measurement items of the Feedforward and Feedback Learning Flow constructs and of Business Performance, since some items from the original scale were excluded from the analyses to improve construct fit.

Therefore, it can be concluded that, by identifying the relationship between learning stocks and flows and business performance in a public company in a developing country, this study validates the scale and supports a broadened and systematic diagnosis of the organizational learning system through the application of both the main structural model and the alternative model. With this diagnostic approach, it is expected to strengthen the company's adaptation, strategic renewal, and sustainability in a complex business environment.

## REFERENCES

Albuquerque, A. da R. P., & Teixeira, R. M. (2016). O processo de identificação e exploração de oportunidade empreendedora com base no modelo de aprendizagem organizacional 4i. *Revista de Ciências Da Administração*, *18*(44), 25–38. https://doi.org/10.5007/2175-8077.2016v18n44p25

Alerasoul, S. A., Afeltra, G., Hakala, H., Minelli, E., & Strozzi, F. (2022). Organisational learning, learning organisation, and learning orientation: An integrative review and framework. *Human Resource Management Review*, *32*(3), 100854. https://doi.org/10.1016/j.hrmr.2021.100854_

AlSaied, M. K., & Alkhoraif, A. A. (2024). The role of organizational learning and innovative organizational culture for ambidextrous innovation. *The Learning Organization*, *31*(2), 205–226. https://doi.org/10.1108/TLO-06-2023-0101

Anand, A., & Brix, J. (2022). The learning organization and organizational learning in the public sector: A review and research agenda. *The Learning Organization*, *29*(2), 129–156. https://doi.org/10.1108/TLO-05-2021-0061

Argote, L., & Hora, M. (2017). Organizational learning and management of technology. *Production and Operations Management*, *26*(4), 579-590. https://doi.org/10.1111/poms.12667

Argote, L., Lee, S., & Park, J. (2021). Organizational learning processes and outcomes: Major findings and future research directions. *Management Science*, *67*(9), 5399-5429. https://doi.org/10.1287/mnsc.2020.3693_

Argote, L., & Miron-Spektor, E. (2011). Organizational learning: From experience to knowledge. *Organization Science*, *22*(5), 1123-1137. https://doi.org/10.1287/orsc.1100.0621

Argyris, C., & Schön, D. A. (1978). *Organizational learning: A theory of action perspective* (M. A.-Wesley. Reading, Ed.).

Argyris, C., & Schön, D. A. (1996). *Organizational learning II: Theory, method, and practice* (M. A.-W. Reading, Ed.; 2nd ed.).

Balasubramanian, N., Ye, Y., & Xu, M. (2022). Substituting human decision-making with machine learning: Implications for organizational learning. *Academy of Management Review*, *47*(3), 448-465. https://doi.org/10.5465/amr.2019.0470

Basten, D., & Haamann, T. (2018). Approaches for organizational learning: A literature review. *SAGE Open*, *8*(3). https://doi.org/10.1177/2158244018794224

Berson, Y., Da'as, R., & Waldman, D. A. (2015). How do leaders and their teams bring about organizational learning and outcomes? *Personnel Psychology*, *68*(1), 79–108. https://doi.org/10.1111/peps.12071

Bianchi, G., Testa, F., Boiral, O., & Iraldo, F. (2022). Organizational learning for environmental sustainability: Internalizing lifecycle management. *Organization & Environment*, *35*(1), 103-129. https://doi.org/10.1177/1086026621998744

Bido, D. S., Godoy, A. S., Quiroga, G. M., Amaral, D., Yoshida, E. C., & Riquetti, A. (2010). Relação entre a aprendizagem organizacional e o desempenho organizacional: Uma abordagem baseada no conceito de estoques e fluxos de aprendizagem. *XXXIV Encontro da Associação Nacional dos Programas de Pós-Graduação em Administração*, Rio de Janeiro, RJ, Brasil.

Bontis, N. (1998). Intellectual capital: An exploratory study that develops measures and models. *Management Decision*, *36*(2), 63-76. https://doi.org/10.1108/00251749810204142

Bontis, N. (1999). *Managing an organizational learning system by aligning stocks and flows of knowledge: An empirical examination of intellectual capital, knowledge management, and business performance* (86).

Bontis, N., Crossan, M. M., & Hulland, J. (2002). Managing an organizational learning system by aligning stocks and flows. *Journal of Management Studies*, *39*(4), 437–469. https://doi.org/10.1111/1467-6486.t01-1-00299

Borman, W. C., & Motowidlo, S. J. (1993). Expanding the criterion domain to include elements of contextual performance. In W. Schmitt & W. Borman (Eds.), *Personal selection in organizations* (pp. 71–98). Jossey-Bass.

Brown, J. S., & Duguid, P. (1991). Organizational learning and communities-of-practice: Toward a unified view of working, learning, and innovation. *Organization Science*, *2*(1), 40-57. https://doi.org/10.1287/orsc.2.1.40

Campbell, J. P., Gasser, M. B., & Oswald, F. L. (1996). The substantive nature of performance variability. In K. R. Murphy (Ed.), *Individual differences in behavior in organizations* (pp. 258–299). Jossey- Bass.

Cangelosi, V. E., & Dill, W. R. (1965). Organizational learning: observations toward a theory. *Administrative Science Quarterly*, *10*(2), 175. https://doi.org/10.2307/2391412

Carpini, J. A., Parker, S. K., & Griffin, M. A. (2017). A look back and a leap forward: A review and synthesis of the individual work performance literature. *Academy of Management Annals*, *11*(2), 825–885. https://doi.org/10.5465/annals.2015.0151

Castaneda, D. I., Manrique, L. F., & Cuellar, S. (2018). Is organizational learning being absorbed by knowledge management? A systematic review. *Journal of Knowledge Management*, *22*(2), 299-325. https://doi.org/10.1108/JKM-01-2017-0041

Chan, D. W. M., Sarvari, H., Golestanizadeh, M., & Saka, A. (2024). Evaluating the impact of organizational learning on organizational performance through organizational innovation as a mediating variable: Evidence from Iranian construction companies. *International Journal of Construction Management*, *24*(9), 921–934. https://doi.org/10.1080/15623599.2023.2239486

Chiva, R., & Alegre, J. (2005). Organizational learning and organizational knowledge. *Management Learning*, *36*(1), 49-68. https://doi.org/10.1177/1350507605049906

Chiva, R., Alegre, J., & Lapiedra, R. (2007). Measuring organisational learning capability among the workforce. *International Journal of Manpower*, *28*(3/4), 224-242. https://doi.org/10.1108/01437720710755227

Choi, I. (2020). Moving beyond mandates: Organizational learning culture, empowerment, and performance. *International Journal of Public Administration*, *43*(8), 724-735.

Collis, J., & Hussey, R. (2021). *Business research: A practical guide for students* (5th ed.). Red Globe Press.

Creswell, J. W., & Creswell, J. D. (2018). *Research design: Qualitative, quantitative, and mixed methods approaches* (5th ed.). Sage publications.

Crossan, M. M., Lane, H. W., & White, R. E. (1999). An organizational learning framework: From intuition to institution. *Academy of Management Review*, *24*(3), 522-537. https://doi.org/10.5465/amr.1999.2202135

Crossan, M. M., Maurer, C. C., & White, R. E. (2011). Reflections on the 2009 AMR Decade Award: Do we have a theory of organizational learning? *Academy of Management Review*, *36*(3), 446-460. https://doi.org/10.5465/amr.2010.0544

Cuffa, D., & Steil, A. V. (2019). Organizational learning in public organizations: An integrative review. *Navus - Revista de Gestão e Tecnologia*, *9*(3), 112–123. https://doi.org/10.22279/navus.2019.v9n3.p112-123.875

Dicle, Ü., & Köse, C. (2014). The impact of organizational learning on corporate sustainability and strategy formulation with the moderating effect of industry type. *Procedia - Social and Behavioral Sciences*, *150*, 958–967. https://doi.org/10.1016/j.sbspro.2014.09.108

Elkjaer, B. (2022). Taking stock of "Organizational Learning": Looking back and moving forward. *Management Learning*, *53*(3), 582-604. https://doi.org/10.1177/13505076211049599

Feng, T. T., Zhang, X., Tan, L. L., & Liu, H. P. (2021). Cross-cultural adaptation and validation of the strategic learning assessment map for Chinese nursing organisation: A cross-sectional study. *Nurse Education in Practice*, *56*, 103185. https://doi.org/10.1016/j.nepr.2021.103185

Fiol, C. M., & Lyles, M. A. (1985). Organizational learning. *The Academy of Management Review*, *10*(4), 803-813. https://doi.org/10.2307/258048

Garza Burgos, R., Johnson, J. P., & Loughry, M. L. L. (2022). Does organizational learning differ in manufacturing and service firms? Evidence from Mexico. *Journal of Knowledge Management*, *26*(7), 1649–1675. https://doi.org/10.1108/JKM-04-2021-0301

Hael, M., Belhaj, F. A., & Zhang, H. (2024). Organizational learning and innovation: A bibliometric analysis and future research agenda. *Heliyon*, *10*(11), e31812. https://doi.org/10.1016/j.heliyon.2024.e31812

Hair, J. F., Black, W. C., Babin, B. J., & Anderson, R. E. (2014). *Multivariate Data Analysis* (Seventh Edition). Pearson Education Limited.

Hamblin, R., Plimmer, G., Badar, K., & Lasthuizen, K. (2024). Organizational ambidexterity: A bibliometric review and framework for future public administration research. *Public Performance & Management Review*, *47*(5), 1073–1109. https://doi.org/10.1080/15309576.2024.2373178

Hansen, G. S., & Wernerfelt, B. (1989). Determinants of firm performance: The relative importance of economic and organizational factors. *Strategic Management Journal*, *10*(5), 399-411. https://doi.org/10.1002/smj.4250100502

Hariharan, K., & Anand, V. (2023). Transformational leadership and learning flows. *The Learning Organization*, *30*(3), 309–325. https://doi.org/10.1108/TLO-09-2021-0115

Hermelingmeier, V., & Wirth, T. (2021). The nexus of business sustainability and organizational learning: A systematic literature review to identify key learning principles for business transformation. *Business Strategy and the Environment*, *30*(4), 1839-1851. https://doi.org/10.1002/bse.2719

Hosseini, S. H., Hajipour, E., Kaffashpoor, A., & Darikandeh, A. (2020). The mediating effect of organizational culture in the relationship of leadership style with organizational learning. *Journal of Human Behavior in the Social Environment*, *30*(3), 279–288. https://doi.org/10.1080/10911359.2019.1680473

Inthavong, P., Rehman, K. U., Masood, K., Shaukat, Z., Hnydiuk-Stefan, A., & Ray, S. (2023). Impact of organizational learning on sustainable firm performance: Intervening effect of organizational networking and innovation. *Heliyon*, *9*(5), e16177. https://doi.org/10.1016/j.heliyon.2023.e16177

Jarque, C. M., & Bera, A. K. (1987). A test for normality of observations and regression residuals. *International Statistical Review / Revue Internationale de Statistique*, *55*(2), 163-172. https://doi.org/10.2307/1403192

Jarvie, W., & Stewart, J. (2018). Conceptualizing learning in the public sector: The importance of context. *International Journal of Public Sector Management*, *31*(1), 14–30. https://doi.org/10.1108/IJPSM-08-2016-0137

Jyothibabu, C., Farooq, A., & Bhusan Pradhan, B. (2010). An integrated scale for measuring an organizational learning system. *The Learning Organization*, *17*(4), 303–327. https://doi.org/10.1108/09696471011043081

Kell, H. J., & Motowidlo, S. J. (2012). Deconstructing organizational commitment: Associations among its affective and cognitive components, personality antecedents, and behavioral outcomes. *Journal of Applied Social Psychology*, *42*(1), 213-251. https://doi.org/10.1111/j.1559-1816.2011.00874.x

Khoshfetrat, R., Sarvari, H., Chan, D. W. M., & Rakhshanifar, M. (2022). Critical risk factors for implementing building information modelling (BIM): a Delphi-based survey. *International Journal of Construction Management*, *22*(12), 2375–2384. https://doi.org/10.1080/15623599.2020.1788759

Kim, D. H. (1993). The link between individual and organizational learning. *Sloan Management Review*, *35*, 37-50.

Lenart-Gansiniec, R., & Sułkowski, Ł. (2020). Organizational learning and value creation in local governance: the mediating role of crowdsourcing. *The Learning Organization*, 27(4), 321-335. https://doi.org/10.1108/TLO-12-2018-0213

Levitt, B., & March, J. G. (1988). Organizational learning. *Annual Review of Sociology*, *14*, 319-340.

Looks, H., Fangmann, J., Thomaschewski, J., Escalona, M.-J., & Schön, E.-M. (2024). Towards improving agility in public administration. *Software Quality Journal*, *32*(1), 283–311. https://doi.org/10.1007/s11219-023-09657-x

Mainert, J., Niepel, C., Lans, T., & Greiff, S. (2018). How employees perceive organizational learning: construct validation of the 25-item short form of the strategic learning assessment map (SF-SLAM). *Journal of Knowledge Management*, *22*(1), 57–75. https://doi.org/10.1108/JKM-11-2016-0494_

Malhotra, N. K., & Birks, D. F. (2007). *Marketing research: An applied approach* (3rd ed.). Prentice Hall / Financial Times.

Manfredi Latilla, V., Frattini, F., Messeni Petruzzelli, A., & Berner, M. (2018). Knowledge management, knowledge transfer and organizational performance in the arts and crafts industry: A literature review. *Journal of Knowledge Management*, *22*(6), 1310-1331. https://doi.org/10.1108/JKM-08-2017-0367

March, J. G. (1991). Exploration and exploitation in organizational learning. *Organization Science*, *2*(1), 71-87. https://doi.org/10.1287/orsc.2.1.71

Matitz, Q. R. S., & Bulgacov, S. (2011). *O conceito desempenho em estudos organizacionais e estratégia: Um modelo de análise multidimensional* (Issue 4). http://www.anpad.org.br/rac

McKenny, A. F., Short, J. C., Ketchen, D. J., Payne, G. T., & Moss, T. W. (2018). Strategic entrepreneurial orientation: Configurations, performance, and the effects of industry and time. *Strategic Entrepreneurship Journal*, *12*(4), 504–521. https://doi.org/10.1002/sej.1291

Neves, E. O., & Steil, A. V. (2019). Medidas da aprendizagem organizacional: Revisão de literatura e agenda de pesquisa. Organizações & Sociedade, *26*(91), 708-728. https://doi.org/10.1590/1984-9260915

Oh, S. Y. (2019). Effects of organizational learning on performance: The moderating roles of trust in leaders and organizational justice. *Journal of Knowledge Management*, *23*(2), 313–331. https://doi.org/10.1108/JKM-02-2018-0087

Olejarski, A. M., Potter, M., & Morrison, R. L. (2019). Organizational learning in the public sector: Culture, politics, and performance. *Public Integrity*, *21*(1), 69-85. https://doi.org/10.1080/10999922.2018.1445411

Patwary, A. K., Alwi, M. K., Rehman, S. U., Rabiul, M. K., Babatunde, A. Y., & Alam, M. M. D. (2024). Knowledge management practices on innovation performance in the hotel industry: mediated by organizational learning and organizational creativity. *Global Knowledge, Memory and Communication*, *73*(4/5), 662-681. https://doi.org/10.1108/GKMC-05-2022-0104

Popova-Nowak, I. V., & Cseh, M. (2015). The meaning of organizational learning. *Human Resource Development Review*, *14*(3), 299-331. https://doi.org/10.1177/1534484315596856

Podsakoff, P. M., MacKenzie, S. B., Lee, J.-Y., & Podsakoff, N. P. (2003). Common method biases in behavioral research: A critical review of the literature and recommended remedies. *Journal of Applied Psychology*, *88*(5), 879-903. https://doi.org/10.1037/0021-9010.88.5.879

Ramadam, A. O., Estivalete, V. de F. B., Stecca, J. P., & Cogo, T. C. G. (2024). Suporte e aprendizagem organizacional: Análise à luz do contexto cooperativo. *Revista de Ciências Da Administração*, *26*(66), 1–26. https://doi.org/10.5007/2175-8077.2024.e89812

Real, J. C., Leal, A., & Roldán, J. L. (2006). Information technology as a determinant of organizational learning and technological distinctive competencies. *Industrial Marketing Management*, *35*(4), 505–521. https://doi.org/10.1016/j.indmarman.2005.05.004

Real, J. C., Roldán, J. L., & Leal, A. (2014). From entrepreneurial orientation and learning orientation to business performance: Analysing the mediating role of organizational learning and the moderating effects of organizational size. *British Journal of Management*, *25*(2), 186–208. https://doi.org/10.1111/j.1467-8551.2012.00848.x

Rodrigues, P. G., Carvalho, R. B. de, & Bernardes, M. E. B. (2019). Aprendizagem organizacional derivada da revisão e implementação estratégica em uma organização do Sistema S. *XLIII Encontro da Associação Nacional de Pós-Graduação e Pesquisa em Administração – EnANPAD, São Paulo, SP, Brasil*.

Rodríguez-Sánchez, A., Guinot, J., Chiva, R., & López-Cabrales, Á. (2021). How to emerge stronger: Antecedents and consequences of organizational resilience. *Journal of Management & Organization*, *27*(3), 442-459. https://doi.org/10.1017/jmo.2019.5

Tian, H., Dogbe, C. S. K., Pomegbe, W. W. K., Sarsah, S. A., & Otoo, C. O. A. (2021). Organizational learning ambidexterity and openness, as determinants of SMEs' innovation performance. *European Journal of Innovation Management*, *24*(2), 414-438. https://doi.org/10.1108/EJIM-05-2019-0140

Valentin, S. M. F. A. de. (2010). *Aprendizagem como estoques e fluxos de conhecimento em organizações que integram redes de informação e conhecimento científico em saúde* (Dissertação de mestrado, Universidade Presbiteriana Mackenzie).

Venkatraman, N., & Ramanujam, V. (1987). Planning system success: A conceptualization and an operational model. *Management Science*, *33*(6), 687-705.

Versiani, Â. F., & Fischer, A. L. (2008). A aprendizagem organizacional como um campo específico de conhecimento no cenário dos estudos organizacionais. *Revista Economia & Gestão*, *8*(18), 10-31.

Wang, C., Zhang, M., & Ma, H. (2024). The more ambidexterity the better? The moderating effect of organizational learning between high-performance HR practices and organizational performance. *Frontiers in Psychology*, *14*. https://doi.org/10.3389/fpsyg.2023.1283637

Wilson, L., Hawkins, M., French, M., Lowe, T., & Hesselgreaves, H. (2023). New development: Learning communities—an approach to dismantling barriers to collective improvement. *Public Money & Management*, *43*(4), 374–377. https://doi.org/10.1080/09540962.2022.2116179

Wong, W.-T., & Huang, N. N.-T. (2011). The effects of e-learning system service quality and users' acceptance on organizational learning. *International Journal of Business and Information*, *6*(2), 205–225.

Yang, B., Watkins, K. E., & Marsick, V. J. (2004). The construct of the learning organization: Dimensions, measurement, and validation. *Human Resource Development Quarterly*, *15*(1), 31-55. https://doi.org/10.1002/hrdq.1086

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- Rosalia Aldraci Barbosa Lavarda
- Leandro Dorneles dos Santos

## History



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|---|---|
| **Recieved:** | 12-07-2024 |
| **Approved:** | 20-08-2025 |
| **Published:** | 08-10-2025 |